

# GUIDELINES

for

# AIRPORT MASTER


# PLANNING



MASSACHUSETTS AERONAUTICS COMMISSION

PLANNING DEPARTMENT

SEPTEMBER, 1979



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AIRPORT MASTER  
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# MASSACHUSETTS GUIDELINES ON AIRPORT MASTER PLANNING

## I. ADMINISTRATIVE

### A. INTRODUCTION

This handbook is a state publication designed to supplement the Federal Aviation Administration's Advisory Circular on Airport Master Plans (AC #150/5070-6) which was published in 1970 when the federal Planning Grant Program began. Like the Federal A. C. this handbook is advisory rather than mandatory.

The reason for a state "advisory circular" to supplement the federal is that the formal process of airport master planning is relatively new. FAA, consultants, airport sponsors and state staff alike have all learned a great deal over the last nine years about what to do and not to do. This document makes supplementary suggestions about how to do some aspects of airport planning better, based on what has been learned. It is also an attempt to amplify at the local level some of the issues and needs specific to Massachusetts and similar older, more densely populated states, which might not be so pressing in a rapidly growing, less developed state. Aviation planning in Massachusetts is at least as much concerned with protecting the airports that already exist as it is with planning for expansion. Physical and environmental constraints often mean it is more viable to enhance and improve what already exists than to construct new facilities. Other states do not necessarily share this approach and nor do the Federal guidelines reflect it.

Owing to the rapidly-changing nature of aviation and to year-by-year improvements in the state of the art, this handbook cannot be a rigid one-time product. For this reason we will supplement it from time to time.

The elements mentioned here in parts I and II on consultant selection, alternatives analysis and community liaison require careful consideration for every full scale master plan, to see if this approach is appropriate. The elements in part III are special issues which may not be needed except in certain cases, so that a justification should be made of why they are being included in a proposal project.

## B. CONSULTANT QUALIFICATION AND SELECTION

The idea of doing a Master Plan may come initially from the Airport Sponsor, MAC or FAA. The chart on the next page shows the usual steps involved. Deciding what needs doing and who should do it are the first steps.

Firms are eligible to undertake airport planning studies in Massachusetts who have already done such work or who were voted as eligible by the Massachusetts Aeronautics Commission in 1978. Other firms wishing to be considered for a particular study are required\* to be reviewed by a panel of two MAC members and one member of the local Airport Commission in question.

In order to facilitate the selection of a suitable firm for the particular tasks involved on any given study, it is suggested that in advance of selecting a firm, the airport staff, airport Commissioners and representatives of MAC and FAA get together in a "First Preapplication Meeting" and talk out what the problems are at the airport and which ones can be addressed by a study. (See Column 2 on the Chart)

The importance of the First Preapplication meeting cannot be over-emphasized. Funds for aviation planning studies tend to be very limited; moreover, too many studies in the past have been done with the best of intentions but with insufficient thought as to the really pressing issues at a particular airport, and as to the best way to address these issues. At worst, the process of a full scale study effort has generated opposition to the airport that was barely articulated beforehand; or an airport study, done without carefully addressing local concerns, has gathered dust on the shelf and only occasionally been used to guide and plan for the future activities of the airport.

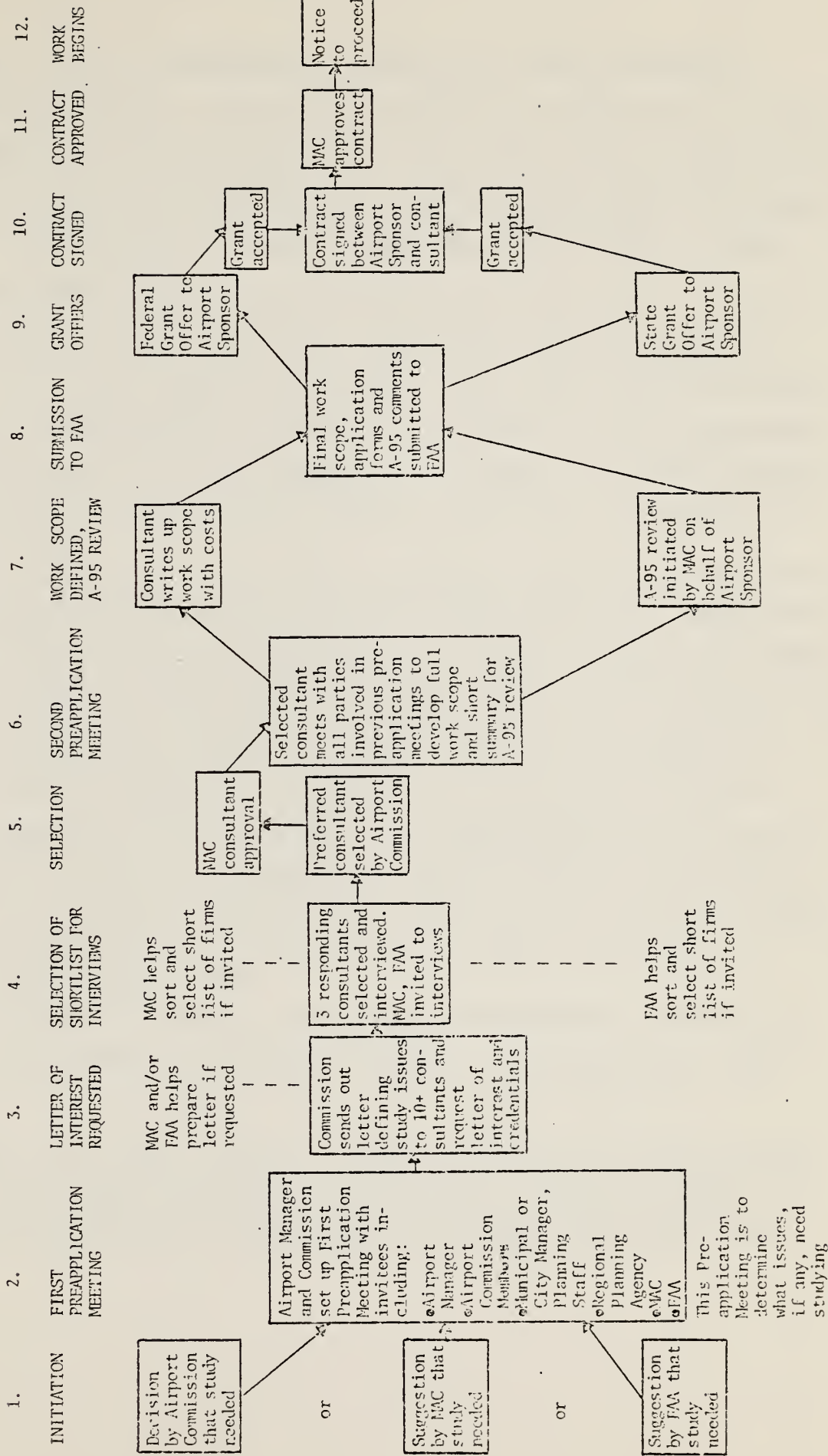
The First Preapplication meeting, which should be between all the government agencies involved, namely

- Airport Commission and Manager
- Selectmen/Mayoral Representatives
- Planning Board
- Regional Planning Agency
- Massachusetts Aeronautics Commission
- Federal Aviation Administration

helps to really clarify the issues and problems at that airport and determine which

\*at its 695th meeting in June 1979 the Massachusetts Aeronautics Commission voted to require planning consultants to undergo the same consultant selection procedure as engineering and construction firms, as voted by MAC in 1974 and described above.









of the problems, if any, is addressable in a Master Plan study as opposed to being resolved some other way. The Master Plan study as a minimum, even in a mini-Master Plan, needs to address the future role of the airport and any facility improvements required to allow it to play that role. Further, it needs to provide a fully up-to-date and complete inventory of facilities and conditions, shown in an airport layout plan. But beyond this the detail on other topics may be great or small, depending on the local situation.

The product of the First Preapplication meeting, assuming it is agreed that a study of some kind is in fact needed, should be a short description of those ten or a dozen study issues most pertinent to the airport. These issues are then used to help determine what kind of consultant expertise is most appropriate. One airport might want to give major emphasis to noise and land use work, another to airspace and obstructions, another to physical constraints or development such as subsoil conditions.

Although the state's formal rules for planning consultant selection are relatively straightforward, it may be desirable to make a choice from among several firms, rather than routinely select the first one that may have made contact with the airport. The ten or a dozen issues defined in the First Preapplication meeting may be used as the basis for a letter to a selected group of firms, requesting credentials, as indicated by Column 3 on the Chart. It may be desirable as a result of the review of credentials to interview up to three firms in person as indicated on Column 4 of the Chart and then enter negotiation with the preferred one of the three.\* This kind of procedure will give the airport a good chance to really be sure it is getting a qualified firm which is willing and able to address its particular concerns. For very small "mini-master plan" type projects an abbreviated process may be suitable.

To facilitate the review of credentials, each consultant interested in doing work in Massachusetts has been asked to supply a one-page summary of their airport work to date, particular strengths, staff size and location etc. This

\*Appendix A shows the "Brooks" law which is now applicable for all direct federal contracts, which requires a procedure of reviewing the credentials of ten firms, interviewing three, and starting negotiations on work scope and determining a price with the preferred one; if negotiations fail, going to the second, and so on.

is not a substitute for the larger credentials package most firms prepare, but a quick means of comparison. It is available from MAC on request.

In a situation of great complexity, more than one preliminary Preapplication meeting might of course be required but the goal should be to resolve the matter in one meeting if possible, followed where necessary with phone calls and so forth between the various parties.

The Airport Commission should set a deadline for response to its initial letter, and after that time should evaluate responses and interview the three or more most suitable firms. After these interviews, which MAC and FAA should be invited to attend, a selection may be made as indicated in Column 5 on the Chart. The selected consultant will then expect to work intensively with the Airport Commission, MAC and FAA to develop a suitable full work scope for the funding application. This is done through the second Preapplication meeting, as shown in Column 6 and 7 on the Chart.

#### C. APPLICATION

The application involves not only the scope of work with schedule and budget, but also a number of legal and administrative documents. Before FAA can approve the application (which does not mean funding it necessarily) an A-95 review by the regional planning agency (MPO/RPA) and the state (Communities and Development) must be completed. MAC normally will file these procedural items as shown in Column 7 and 8. Either a full work scope can be submitted with the A-95 applications or a shorter version as shown in Column 6.

Once an application is approved, the only changes may be updating if there is a long wait between application and funding.

#### D. FUNDING

Both federal and state grant offers will be made once federal funds are available (state funds come from a bond issue) and must be formally accepted by the Airport Commission Chairman and town/city counsel. A contract between the consultant and the Airport Commission may then be signed which MAC must then approve - see Column 11, and work begins after a written Notice to Proceed, as shown in Column 12, has been received by the consultant from the Airport Commission. The current funding ratio is 80% Federal, 15% state and 5% local - which last can, if appropriate, be provided by inkind services, for example, for noise, land use, zoning and community liaison work..

## II. PROCEDURAL

### A. ALTERNATIVES ANALYSIS

The consideration of alternative scenarios for the airport's future and alternative solutions to identified capacity or other problems, is an essential element of an airport study. Rather than a single recommended plan evolving out of the technical analysis, the study participants should anticipate the evolution of several possible directions. The maximum future for the airport is only one alternative, contrained by physical and financial considerations only. The community may decide it wants a less ambitious future than is physically feasible. Citizen suggestions on ways to solve problems may lead to consideration of new alternatives not previously identified by the consultants.

A strong emphasis, when looking at alternatives, is to see whether non-capital or low capital intensive options are available. For example, could a desired crosswind runway double as a taxiway for the primary runway? Could terminal building congestion be handled by better scheduling rather than be construction of more space? The purpose of this approach is to make sure that whatever is built is the most cost-effective solution, not only in terms of the initial capital investment but also in terms of associated operating and maintenance expenses over its years of life.

The first major public meeting in a master plan study will usually be after the inventory work is done. The second one will usually be after the forecasts are done and the major capacity and other problems identified. It is this meeting which should present and discuss the alternative futures for the airport, and develop any new ideas for inclusion.



## B. COMMUNITY LIAISON

Community input is essential throughout the master plan study. Together with alternatives analysis it can help to ensure that the final recommended plan has consensus.

There are several ways to involve airport neighbors and user groups in a Master Plan study. The federal guidelines suggest that the key ingredient is a public presentation after the plan has been developed. Experience in Massachusetts shows that unveiling even a modest expansion plan to an unsuspecting public at this stage causes nothing but trouble, especially as the consultants have usually just about used up their funds and may not be able to investigate new issues raised by attendees at this final meeting.

Rather, it seems to work better to involve the public from the start. But this cannot be just a general invitation to attend meetings. A possible way to proceed is for the Airport Commission and its municipality(s) to set up a technical or policy advisory committee representing business, neighborhood, conservation and aviation groups. In order to gain continuity and responsible input we suggest that each member of this committee be designated and sent by his/her member organization, reporting back to them on what is being discussed, and relaying to the consultants the concerns of that group. Once appointed, the members should stick with the study until it is done, or if they have to unexpectedly drop out, ask their organization to appoint someone else and brief that person on what has been happening so the newcomer does not waste the whole committee's time getting up to speed.

This Advisory Group should be set up through the Airport Commission and municipality, invitations to designate someone coming from the highest level. Contact will be by phone and letter with meeting agendas sent well ahead, and technical reports of the consultant sent out for Advisory Group review in advance of meetings. The role of the committee initially will mostly be to digest findings and ask questions as the data collection takes place. Then when the time for formulating alternatives comes, major policy input will be needed and major discussion can be expected.

In addition to an "inner circle" as just described, the public at large should be invited to all Advisory Group meetings, as observers who may get involved in discussion by permission of the Advisory Group. The public should also be kept apprised of the study through newspaper notices of meetings, newsletters reporting findings, and press releases by the Airport Commission as seems appropriate. The mailing list for the newsletter can be developed with the help of the Advisory Committee and should be open-ended.

At the public hearings or presentations on the proposed plan, all persons may participate, not just Advisory Committee members. The goal of the final meeting is that there should be no surprises which is how it will turn out if a thorough

airing of technical findings and alternative plans has taken place during the course of study.

The secretarial and liaison work for this process can be borne either by the local agencies, or the consultant, or they can share it. The arrangement must be resolved in advance along with resolving the rest of the scope of work, and the final contract document should include a timetable for all meetings and the final hearing.

Whoever carries out the work, the onus should be on the consultant, during the application period, to ensure that the Airport Commission, municipality, and other participating agencies are ready to play their roles in the liaison program. The Airport Sponsor should identify those local groups and their contact person who should be represented on the committee, but it is up to the consultant to make sure that a specific action program is part of the scope of work.

Invitees should include at least the following groups:

- airport user groups (e.g. flying clubs)
- neighborhood groups
- local civic and service organization such as Chamber of Commerce, Kiwanis, etc.
- League of Women Voters
- Conservation Commission
- adjoining municipalities and/or airports

### C. ONGOING LIAISON

Once an airport advisory group and a broader mailing list have been set up, an Airport Commission may wish to consider keeping it functioning after the Master Plan Study is complete.

During the study, it will usually be appropriate to identify a liaison person in the municipal administration who takes on a responsibility for airport matters and is authorized to assemble technical assistance to the airport as needed - for example, bringing the municipal engineer into the airport study process at key times. The municipality and Airport Commission may want to keep an ongoing liaison person after the Master Plan is complete. Such a person can not only keep the citizenry involved in new issues as necessary, but also find technical help to solve new airport problems, working with the airport manager, as they arise. Since Master Plans to date have only been funded about every seven to ten years, this kind of ongoing troubleshooter could be very useful. MAC too, is willing to provide ongoing help, but the best help is local help, where a full knowledge of social, political and technical problems is available.

Indeed, Airport Commissions not currently involved in a Master Plan may want to consider setting up a structure of municipal involvement so that they can keep fully abreast of technical issues as they develop. MAC help is available to organize this.

### III TECHNICAL

#### A. UTILITY MAPS

This work item is not included in the federal A. C. but is eligible, though it may be expensive. It is often needed at airports that have changed hands, where good records may not have survived. At some airports whenever a construction project is started, unexpected electrical, water, gas or sewage lines may be uncovered in inconvenient places. The object of this task is to map them once and for all in such a way that the airport manager can easily see what is out there and also can easily add to it when anything new is built. The condition and status of utilities (i.e. abandoned, overloaded, etc.) should be included.

Each utility should be mapped using city, town or airport records, plus field checks. The map should note depth as well as location. A base map showing the runways, aprons, taxiways, terminal areas and airport property line should be prepared at the same scale.

#### B. MANAGEMENT SOLUTIONS TO CAPACITY PROBLEMS

This issue received a passing mention in the discussion on alternatives analysis and is amplified here.

In any instance where a Master Plan shows a need for extra runway length or strength, more taxiways, aprons, tiedowns or terminal facilities, especially where substantial increases in activity are forecast, then before fullscale new facilities are recommended an examination must be made of less capital intensive ways to meet the need, for example:

- spread the peak times of day, week, or season out longer (either by charging differential landing or other fees, or by publicizing the "crunch" times and asking people to avoid them if possible, or both)
- get better use out of runways by adding or improving a taxiway
- get better use out of runways by improving effective runway length through obstruction removal
- install a tower (this assumes FAA criteria can be met) or operate it for more hours



- install better nav aids
- holding pads, high speed turn-offs

Some of these "management" solutions may also cost money to build or operate, but normally, not as much money as for a major expansion. Note also that a full environmental impact statement is often not required for "management" solutions, allowing immediate implementation in many cases, unlike capital projects.

### C. ECONOMIC ISSUES

The users served by an airport, and their role in the local economy, is a topic not specifically addressed in the federal Advisory Circular. Yet the Master Plan, in depicting a future role and development schedule for the airport, needs to recognize this issue. MAC has been working on this issue both because of its importance to the individual airport and at the statewide level, with a view to classifying the State Airport System according to "airport importance" as determined in part by each one's economic contribution.

The primary tool developed to date is a user survey. Experiments with several questionnaire designs have been made at MAC. The format should be fairly brief but cover these key issues:

- who is using the airport, how much, and for what purposes
- total employment of businesses using the airport
- fraction of employment considered to be airport dependent
- user's alternative actions, and their degree of hardship if this airport not available

MAC can provide help in designing a suitable questionnaire. The survey method can be used alone, or it may be supplemented by direct airport employment data (FBO, manager, tower) and the combined airport-dependent employment (user and on-airport jobs) be presented in relation to total local employment. (More sophisticated measures than jobs are of course possible, but costly to develop and do not necessarily add much to the non-aviation person's perception of what the airport is doing.) Depending on the situation, a qualitative highlight of key users may be as much use as a comprehensive statistical analysis in developing awareness of the airport's role but ideally some of each is needed. In addition to identifying the airport's contribution to the economy in terms of jobs, the comprehensive user survey can provide some useful data on patterns of activity at the airport - for instance how much is business-related as opposed to private flying, and how far-flung are the trips being made.

Master Plan consultants should consider the spectrum of economic studies possible and discuss with the airport sponsor which elements could be most useful:-

- user survey showing patterns of activity at airports i.e. mix of business, instruction, etc.
- economic impact study to identify jobs generated by users and airport operators in the context of the total local economy.
- identify users but no survey - interview and profile key users.
- combination of the above.

Note that one of the biggest problems with the comprehensive approach is to identify the transient users of the airport. Not all airports keep an adequate transient log. If a user survey is desired, it is recommended that an agreement be reached with the airport manager to set up a system (transient log, fuel sale records, etc.) to list transient names and addresses ( and it is useful to distinguish business from private transients) prior to the inception of the Master Plan study so that a mailing list will be available at the beginning of the study.

#### D. FINANCIAL/FISCAL

MAC has been examining airport records to determine the trends of revenues and expenses over the last 5 years. Discussion with MAC should take place as to what analysis of future funding mechanisms is worth undertaking in this period of fiscal and inflationary uncertainty. It may be more important to focus on building up a financially self-sufficient airport from the operating cost standpoint (for example by buying buffer zone land such as potential industrial land that can yield an income to the airport) than to expend all the consultant effort on identifying where the 5% local ADAP share will be found for periods beyond the first couple of years.

#### E. MANAGEMENT AND INSTITUTIONAL ISSUES

Some airports have full time airport commission appointees as managers, Others have a part time manager who is also an FBO. In the latter case, contract and lease agreements vary widely. At every airport, the quality of its management has a lot to do with the viability of the airport. Master Plan studies should review management needs and recommend options for changes in the structure if this seems appropriate (e.g. from part time to full time, from FBO to airport commission employee, or from one set of job tasks to another). This task will be particularly vital if there has been a problem - for instance rapid turnover, lack of continuity, inability to find a suitable candidate etc.

#### F. BORINGS

Actual field borings may be needed to confirm or eliminate alternative courses of action that the planning analysis may suggest. It may be useful to do enough of this kind of engineering analysis to ensure that the proposed projects are at least feasible from an engineering standpoint.

The U. S. Department of Agriculture soil conservation maps are good preliminary sources for planning. It may be useful to do testing to check reported pavement strengths and verify or update them if there is any reason to doubt the "as-built" drawings.

#### G. PROPERTY SURVEY

If ownership or boundary lines are unclear a property survey and/or title search may be needed, especially if projects are being proposed for areas of uncertain status. This can be costly so it should be very clearly defined in advance whether new work will be necessary.

#### H. TOPOGRAPHIC SURVEY

A survey to obtain accurate contours may be needed; photogrammetry may also be necessary.

#### I. AERIAL PHOTOS

A current high quality aerial photo should be an essential feature of every Master Plan. The Massachusetts Department of Public Works is often able to supply recent photos. It is particularly useful as a means of depicting land use and should be part of the ALP series, one in the same scale as the layout plans and one showing noise contours and including a larger area if necessary.

#### J. FORECASTS

Master Plan consultants should be careful to fully apprise themselves of forecasting work already available before designing a work item for modeling efforts at the individual airport.

Most airports in the Commonwealth are nowhere near capacity except for a few peak periods and the purpose of forecasts is simply in order to have a general sense of the probable pace of change. Forecasts may be needed for noise contours if these are going to be produced, although at small airports it is not clear whether a computer-produced set of contours (requiring statistical input) is needed. (See Section N)



FAA's Aviation Forecast Branch in Washington now produces Terminal Area Forecasts annually for every airport in the National Airport System Plan. Only about 900 airport forecasts are published but the remainder are available from FAA or from the MAC (which hopes to keep a current set on file). In addition a program named Terminal Area Forecast Data System (TAFDS) allows users to alter the assumptions of the model and generate alternative forecasts. The TAF work is now becoming sufficiently accurate that at least for the GA airports it may be all that is needed. The consultant should simply allow a modest amount of time for iterations and interpretations. Computer access to the TAFDS is expected to be available in 1980.

Prior to the availability of the TAFDS the MAC has, through state level PGP funding begun a process of RPA-level forecasting for Massachusetts based upon econometric models for GA and air carrier activity and upon a trend model for commuter. These forecasts also will be set up in an interactive mode with the user being able to change assumptions and generate forecasts for different scenarios. The interactive programming has not yet begun and the full package is expected to be on-line by about mid-1980. In the meantime, MAC can provide high, medium and low forecasts by RPA which will be available shortly and require only allocation from RPA to individual airport. Peak period capacity analyses can then proceed using these numbers.

Between the MAC and the FAA forecasts there does not seem likely to be a need for modelling efforts at airports without current or shortly expected critical capacity or peaking problems unless for some reason unusually rapid growth is anticipated.

At airports where an examination of peak-hour or peak-day demand and capacity is needed (which is common at the Cape and Islands airports owing to their high degree of seasonality) one may need to undertake a more detailed forecasting effort. The same may be true for any airport approaching annual capacity (for example, the Boston subsystem).

In conclusion, the degree of forecasting and demand/capacity work that may be appropriate requires careful discussion at the preapplication stage.

#### K. NAVAIDS

In an airport Master Plan, navigational aid improvements are often proposed along with other airport improvements. Many navaids have been funded through ADAP with a federal-state-local funding arrangement and subsequent local maintenance. There are two other mechanisms for navaid installation and maintenance.

FAA's Airways Facilities Division, Facilities and Establishment Branch (F&E) provides most major navaids through 100% FAA funding for both installation and operations and maintenance. Some navaids installed under ADAP in Massachusetts and maintained by the airport have subsequently been taken over by F&E, although there is sometimes a problem of differences in specifications and standards.

The third source of navaid funds is from MAC. Traditionally, the legislature has returned to MAC, either in an appropriation or a bond, an amount of money for state navaid based upon the amount collected by MAC from aircraft registration fees--around \$54,000 in 1977. These MAC funds have generally been spent on simple navaid such as runway painting, road signs, windsocks, rotating beacons and radio beacons.

Consultants, in reviewing navaid needs during the course of a Master Plan Study, should, therefore, carefully consider the appropriate funding source, to fit the scale and urgency of the project in question.

#### L. AIRPORT HISTORY

Some Master Plans to date have very good airport histories; others are not very informative. What is most useful in a history is something fairly succinct covering the following issues:

- how and when the airport became a public use facility (from military, private, etc.)
- chronology of major facility improvements; e.g., when first paved, lighted, any runway extensions.
- chronology of any scheduled service.

#### M. NOISE

Airport related noise is the most serious environmental problem facing airports. Solving the problem involves 3 elements:

1. Manufacturing quieter aircraft. This is being achieved slowly by setting noise standards and compliance deadlines known as FAR 36, for the design and manufacture of aircraft. Jurisdiction for this part of the solution rests entirely with the federal government. Massachusetts has, for some years, been very active in urging the FAA to tighten their standards particularly as they apply to propeller aircraft, the primary users of our GA airports.

2. Operating procedures. Over the last few years many of our Massachusetts Airports in cooperation with the MAC and FAA, have developed specific procedures to address their particular noise problems. Operating procedures are not a panacea but they can help to minimize noise impacts. Where an airport does not already have procedures, the merits of introducing them should be reviewed in a Master Plan if appropriate.

3. Land use is the critical third element because all of the noise reduction benefits gained through procedures or quieter aircraft will be of little value if homes and other incompatible development continue to be built near airports. Also, no matter how great are the noise reduction benefits achieved by these two methods, aircraft will always make noise; and there will always be areas near an airport that need safeguarding against incompatible development.

Of these three elements, land use is the one that is entirely the responsibility of each local government; it is also the most appropriate one to be addressed in the Airport Master Plan. It is an extremely important component which needs close attention. Suggested tasks and processes to be followed are outlined below.

Integral to any consideration of noise and land use is the question of how we measure and describe noise. Noise exposure due to aircraft operations is often depicted by a set of contours. There are several noise measures and rating systems but the one recommended by the EPA and used for a number of our Massachusetts airports is  $L_{dn}$  which means day-night average noise level.

Noise exposure contours can be useful by showing the areas and population affected by noise and giving an idea of the magnitude of the problem. For land use planning, contours can be a guide to determining what areas near an airport are suitable or unsuitable for certain kinds of land use.

Noise exposure contours do, however, have their limitations which master planning consultants should be aware of so as to avoid preparing unnecessary contours or, worse yet, ones that do more harm than good.

From our experience, here are some of the problems associated with noise exposure contours and also some caveats.

First, a couple of the problems:

1. Noise exposure contours represent averaged noise levels. For many of our GA airports where the number of operations is modest and the airplanes in use are primarily propeller driven, the contours will not tell us very much. They will not, for example, reflect the single event noise that results from a particular operation and may be a nuisance to airport neighbors.

2. As a land use planning tool, contours are of limited value unless there are standards which have established maximum noise exposure limits for particular land uses. The only state which has such standards is Maryland. For residential land use, for example, their maximum cumulative noise exposure is  $65L_{dn}$ ; the regulations become more stringent over time as airplanes become quieter. The Department of Housing and Urban Development (HUD) considers anything above  $65L_{dn}$  unacceptable for residential



development and, for the most part, ineligible for HUD financial assistance. The Environmental Protection Agency (EPA) considers  $55L_{dn}$  its noise goal for residential areas in general, not just around airports.

From our experience with Massachusetts airports we know that complaints often begin in the  $50-55L_{dn}$  range although this is often about what the ambient noise level is. We also know that with the exception of several air carrier airports and airports with military operations, land areas exposed to  $L_{dn} 60$  or greater are contained within airport property at almost all of the state's GA airports.

Relating this to the value of contours in land use planning, what seems to happen is this: the contours will often indicate that an airport does not have a noise problem now by any reasonable criteria; so it is hard to use them to make a case for land use controls particularly when they show us that most if not all of the seriously noise affected area is within the airport boundary.

Yet, we also know that noise complaints are often made by people living in the  $50-55L_{dn}$  area which is much quieter than the Maryland or HUD residential standard of  $65L_{dn}$ . We believe it does make sense to encourage communities to prevent incompatible development out to the  $55L_{dn}$  contour (EPA goal) but we should note that this often encompasses a good deal of land and may not be acceptable to the local community. Master Plan consultants who wish to pursue this further should familiarize themselves with the recently completed ANCLUC (Airport Noise Control and Land Use Compatibility)

Carr Lynch Associates.

In sum, we do not believe that every airport master plan requires noise exposure contours. If, however, it is the consensus of all involved that contours should be prepared, here are a couple of caveats and some suggestions.

1. To describe the present noise situation, one set of contours should be prepared, preferably using  $L_{dn}$  and based on an average day's operations (not a "typical busy day" which in fact is an exceptional day that hardly ever occurs). Estimates of the number of affected households in each contour should be provided. The contour map should be the same scale as the ALP and any land use maps to be used and should be suitable for use as an overlay on maps of land use (actual or planned) and zoning.

2. While a second set of contours projecting future noise exposure based on forecasts of future operations can be useful for land use planning, our experience has been that such forecasts tend to depict a worse noise case than is likely to happen, primarily because of overly high forecasts and insufficient consideration of the impressive gains that are being made to quiet aircraft at the source. The result is often rather expansive noise contours that needlessly intimidate the community.

If the sponsor is convinced that a set of future noise exposure contours is called for, we believe it makes sense to prepare contours based on an increase of "so many operations" without forecasting a date when this level is expected to occur.

The following outlines the tasks and process involved in the land use component of the master plan. From the outset, the local Planning Department and Planning Board as well as the Airport Commission should be involved in this effort.

1. Existing Conditions (Map and Describe)
  - A. Airport boundary
  - B. Existing land use on and off the airport
  - C. Uses permitted by existing zoning
  - D. Approach protection zones
  - E. Noise contours (if prepared)
  - F. Development potential around the airport
    1. Natural features affecting development
    2. Available utilities (water, sewer, electricity, roads, etc.)
- II. Existing and Potential Land Use Conflicts
  - A. Identify and describe parcels
- III. Land Use Alternatives
  - A. For each parcel identified in II, outline ways to correct or prevent incompatible use.
  - B. Determine cost/benefit, constraints, advantages for each option
  - C. Review alternatives with airport proprietor and local planning officials
- IV. Suggested Land Use Plan
  - A. In conjunction with airport proprietor and local planning officials, select most feasible and effective land use alternatives
  - B. Presentation of plan to local officials, and aviation affected community
- V. Implementation of Land Use Plan
  - A. Actions to be taken ( e.g., zoning, land acquisition, etc.)
  - B. Responsibility for carrying out plan
    1. Political body or group responsible for each action
    2. Outline of procedures
    3. Timetable indicating when action should be carried out and completed
  - C. Monitoring
    1. Identify how to establish mechanism for making sure that future land use actions which may affect airport compatibility are brought to attention of the airport proprietor and the Massachusetts Aeronautics Commission

For a detailed discussion of ways to promote compatible land use see CASPP Technical Memorandum #16 "A Guide to Compatible Land Use Planning Near Airports in Massachusetts" prepared by the MAC Planning Department.

#### IV. RELATIONSHIP BETWEEN INDIVIDUAL MASTER PLANS AND STATE SYSTEM PLAN

The Massachusetts Airport System Plan includes all publicly owned airports - which are eligible for Master Plans - as well as key private airports, which are not. FAA's original concept was that state system plans would be done first, to provide the framework for the individual airport studies that would ensue. However, in most states, including Massachusetts both efforts began simultaneously, and 8 Master Plans were completed in Massachusetts prior to the publication of the First (1973) State System Plan. FAA's State Airport System Planning Advisory Circular (AC 150/5050-3A) sums up the situation:

"Individual airport master plans, which reflect the detailed planning of a single airport, are accomplished within the framework of the state or regional system plan. Ideally, master planning should take place after the system plans have been completed. However, the urgency of development needs at many locations dictates that individual airport planning be expedited irrespective of the existence of a system plan. Where master and system plans proceed concurrently, there must be effective coordination between the two".

The Continuous Airport System Planning Process (CASPP) is a little more specific: (Advisory Circular #150/5050-5)

"The airport system plan, which is a representation of the aviation facilities needed to meet the short, intermediate, and long-range air transportation requirements of the area, establishes the role, generalized developmental requirements, and timing of development for individual airports within the system. This in turn provides the framework for detailed airport master planning. A system plan is developed around established policy, forecast requirements, the existing system of airports, socio-environmental-financial constraints, and public comment".

It is obvious that many elements of a master plan, such as the inventory, wind data, financial information, land use and noise analyses, are highly airport specific. The elements of a Master Plan which are system related are those which deal with an airport's role in the overall hierarchy - both its current role and the future role it will need to play in order to meet the statewide air transportation needs. Obviously there is the possibility of the local perception of a suitable role for the airport being different - either greater or lesser, - than the role that seems suitable from the state level. An interactive process between the state and the individual airport sponsor seeks to resolve any discrepancies, not only during a Master Plan study but on a constant basis.

The Master Plan study, as the technical basis for the airport's future, can best facilitate this interaction by ensuring close coordination between the state and local levels on all technical areas which have systemwide implications, such as:



- forecasts
- facility
- schedule of proposed development
- public input

Forecasts have already been discussed in Section III. For smaller airports, the TAF or MAC's RPA forecasts may be sufficient. In other cases specific new forecasts may need to be an element of the master plan study, but a broad look must also be taken at existing trends and forecasts for other airports in the same region, at the statewide and RPA forecasts. While discrepancies are acceptable they should not be too large in magnitude and the reasons for the discrepancies should be understood by all concerned, i.e. there should be an "agreement to differ". The Master Plan forecasting task should discuss the relationship of the airport under study to other airports in the vicinity that may have overlapping service areas.

Facility requirements determination obviously must be a major part of a master plan, but each facility requirement should be tied to a specific level of activity i.e. when the airport reaches a certain level of activity it will need certain facilities to serve it. The facilities should be prioritized according to local desires in the Master Plan. At the system plan level, however criteria are needed for choosing between airports and airport projects based on a system wide determination of each type of airport's role in the system. The eventual capital program will then be a result of iterations between locally perceived and state-perceived needs.

The schedule of proposed development should not specify certain events at certain years but rather just the priority list discussed and a probability of when the need for each facility will arrive. The actual schedule of developments at a specific airport will depend upon:

- a) whether the developments are still needed, depending on whether predicted activity levels actually materialize and
- b) the claims of competing airports for limited funds.

Public input about airports should be as ongoing as possible at the local, regional and state level, so that the commencement of a master plan does not in and of itself bring out unexpected airport opponents, and so that at all times the state level has a reasonable awareness of each locality's attitude to its airport which can be continuously factored into the state view of each airport's role in the state system.

APPENDIX A  
BROOKS LAW

92nd Congress, H. R. 12807  
October 27, 1972

AN ACT

To amend the Federal Property and Administrative Service Act of 1919 in order to establish Federal policy concerning the selection of firms and individuals to perform architectural engineering, and related service for the Federal Government.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the Federal property and Administrative Service Act of 1949 (40 U.S.C. 471 et seq.) is amended by adding at the end thereof the following new title:

"TITLE IX - SELECTION OF ARCHITECTS AND  
ENGINEERS

Architects  
and engineers  
Federal se-  
lection poli-  
cy, establish  
ment.  
63 Stat.3771  
82 Stat.1104

"Definitions

"Sec. 901. As used in this title-

"(1) The term 'firm' means any individual, firm, partnership, corporation, association, or other legal entity permitted by law to practice the professions of architecture or engineering.

"(2) The term 'agency head' means the Secretary, Administrator, or head of a department, agency, or bureau of the Federal Government.

"(3) The term 'architectural and engineering services' includes those professional services of an architectural or engineering nature as well as incidental services that members of these professions and those in their employ may logically or justifiably perform.

86 Stat.1278  
86 Stat.1279

"Policy

"Sec. 902. The Congress hereby declares it to be the policy of the Federal Government to publicly announce all requirements for architectural and engineering services, and to negotiate contracts for architectural and engineering services on the basis of demonstrated competence and qualification for the type of professional services required and at fair and reasonable prices.

"Requests for Data on Architectural and Engineering  
Services

"Sec. 903. In the procurement of architectural and engineering services, the agency head shall encourage firms engaged in the lawful practice of their profession to submit annually a statement of qualifications and performance data.

The agency head, for each proposed project, shall evaluate current statements of qualifications and performance data on file with the agency, together with those that may be submitted by other firms regarding the proposed project, and shall conduct discussions with no less than three firms regarding anticipated concepts and the relative utility of alternative methods of approach for furnishing the required services and then shall select therefrom, in order of preference, based upon criteria established and published by him, no less than three of the firms deemed to be the most highly qualified to provide the services required.

"Negotiation or Contracts for Architectural and Engineering Services

"Sec. 904 (a) The agency head shall negotiate a contract with the highest qualified firm for architectural and engineering services and compensation which the agency head determines is fair and reasonable to the Government. In making such determination, the agency head shall take into account the estimated value of the services to be rendered, the scope, complexity, and professional nature thereof.

"(b) Should the agency head be unable to negotiate a satisfactory contract with the firm considered to be the most qualified, at a price he determines to be fair and reasonable to the Government, negotiations with that firm should be formally terminated. The agency head should then undertake negotiations with the second most qualified firm. Failing accord with the second most qualified firm, the agency head should terminate negotiations. The agency head should then undertake negotiations with the third most qualified firm.

"(c) Should the agency head be unable to negotiate a satisfactory contract with any of the selected firms, he shall select additional firms in order of their competence and qualification and continue negotiations in accordance with this section until an agreement is reached.

Approved October 27, 1972

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Legislative History:

House Report No. 92-1188 (Comm. on Government Operations).

Senate Report No. 92-1219 (Comm. on Government Operations).

Congressional Record, Vol. 118 (1972):

July 26, considered and passed House.

Oct. 14, considered and passed Senate.



## APPENDIX B

### FAA RECENT THINKING ON AIRPORT PLANNING

#### STRUCTURING THE SCOPE OF A MASTER PLAN PROJECT

Purpose: This paper is intended for use by airport sponsors, consultants, state aviation officials, and FAA representatives in structuring the work scope of master plan projects. It is intended to be used in developing airport master plans that are more responsive to sponsor needs through improved tailoring of the planning effort to the particular airport. The paper also discusses some areas of the master planning process that have not received adequate attention in the past. Many of the ideas suggested are appropriate for consideration during preapplication activities.

Background: Planning provides the airport sponsor with information necessary for making policy, budgetary, and development decisions. The current master planning process relates very closely to the 13 inter-related elements discussed in FAA Advisory Circular (AC) 150/5070-6. While the degree to which these elements are considered in a particular study varies substantially, PGP funded master plans are usually designed to address all or nearly all the elements in some manner. It has been contended that allowing master plans to consider less than the full 13 elements would lead to the use of PGP funds to undertake piecemeal planning to support immediate development projects rather than producing comprehensive plans.

Although the current approach to master planning has usually been effective, inefficiencies can occur if the study's work scope is not thoroughly investigated during the project's formulation. For example, a detailed capacity analysis for an airport forecast to have 15,000 annual operations is a waste of time when one considers that a single runway has an annual capacity of 100,000 operations. Similarly, in many cases, investigation of airport access for many smaller airports is unnecessary and could be omitted from the study without having any detrimental effects on the final plan. The foregoing inefficiencies could be reduced by the proper scoping of the study effort.

The structuring of the master planning effort is another area that could be improved. All too often, the approach has been to sequence the study effort so that an element is basically completed before work on another element is initiated. For example, the preferred development alternative is often selected prior to the environmental analysis or without consideration given to the financial implication of the development. The fallacy of this approach is that all the master planning elements are interrelated and, therefore, cannot be treated separately. Further, if environmental impacts are significant, it is contrary to CEQ Regulations and, hence, subject to challenge in the courts, to select

the preferred alternative without considering the environment. In the preceding example, integration of the environmental assessment and financial analysis into the early stages of the planning process may result in the selection of a different alternative. It must be recognized that planning is an iterative process. Elements often overlay and activities under the various elements may occur simultaneously.

#### Policy:

1. Greater emphasis must be placed during the formulation of a project's program narrative on tailoring the work scope to the individual airport rather than using a standard "boiler plate."
2. It is not always necessary to undertake a detailed analysis of 13 elements in every master planning effort.
3. More reliance must be placed upon available information developed by other sources such as system planning efforts.
4. Master plans are the output of an iterative process in which the elements are interrelated.

Discussion of the Master Planning Process: In this section, each of the 13 planning elements is discussed along with ideas for increasing the efficiency and usefulness of the planning process. These are general examples and should not be considered applicable to every situation. The scope of each element should be determined during the study design with emphasis being placed upon developing a document which fulfills the needs of the airport sponsor. For the purposes of this paper, each element is discussed separately.

a. Inventory: Data collection should concentrate on the information directly related to the airport. The aim here should be to eliminate the "filler material" that make some of the completed PGP master plans read like "storybooks." For example, historical background on the origins of the town may be interesting but in almost all cases is not essential. Similarly, socioeconomic or other demographic data are often presented but their relation to the aviation planning project is usually stated in very shallow terms. In the case of master plans for some smaller airports, the presented socioeconomic data is virtually ignored in the remainder of the report. Socioeconomic data should be limited to that having a direct bearing on the study and the significance discussed.

b. Forecasts: More reliance must be placed on the use of existing information. In view of the low activity and slow growth rate at many facilities undertaking master plans, a relatively large margin of error can be tolerated without having an adverse effect on development schedules. State and metropolitan/regional system plans often provide

sufficient forecast information for developing a master plan. (Note: One objective of a continuous planning process is to keep the system plan's forecast information up-to-date.) Although the number of airports contained in the FAA's published Terminal Area Forecasts (TAF) is limited, the forecasts for approximately 5,000 airports (including all NASP airports) are updated annually as part of the TAF and are available through the FAA's regions. These TAF forecasts are developed on a state-by-state basis. In many major metropolitan areas, the FAA also prepares hub forecasts for all airports located in the area. Any one of the above sources may provide sufficient information for master planning. If forecasts at a general aviation location must be developed independently, forecasts of based aircraft, itinerant operations, local operations, total operations, and instrument operations would generally suffice.

Master plans which are expected to include new runways for capacity purposes or the selection of a site for a new airport normally should include an independent forecasting effort as part of the work scope. This is needed for establishing the requirement as well as preparing the necessary environmental analysis.

c. Demand/Capacity Analysis: In almost all cases, the necessary capacity information can be obtained from appendix 1 or appendix 4 of Techniques for Determining Airport Capacity and Delay, Report No. RD-74-124. (AC 150/5060-4 explains how to obtain this report.) Although a detailed capacity analysis provides more accurate figures, at most facilities the cost of such an effort outweighs the benefits, especially when the margin of error inherent in a capacity analysis is considered. Two exceptions to this general rule are when the existing airport is expected to reach capacity during the 10-year planning period or the master plan is expected to recommend for capacity purposes major facility improvements; i.e., a new replacement airport, new runway, or runway realignment. These determinations can be made during preparation of the study work scope by comparing the capacity determined from the preceding publications with the TAF forecasts. In these cases, a detailed capacity analysis of the existing facility should be provided for in the study.

d. Facility Requirements: The complexity of this element will be dependent upon a number of factors such as the configuration of the existing facility and the forecasted demand. In many cases, this element should be fairly straightforward since the determination of facility requirements have already been completed to some extent under a system plan. Various alternatives for accommodating the forecasted demand should be developed under this element. The engineering feasibility,



environmental impacts, and financial analysis of the alternatives will be examined as part of the planning process and will be key inputs in determining the preferred alternative. An evaluation of the existing site's ability to accommodate these facilities should be included in this part of the study.

e. Environmental Analysis: In theory, the environmental assessment was always intended to be an integral part of the planning process. However, in practice, the environmental assessment was, all too often, initiated after an alternative was selected with the purpose of determining its environmental acceptability. The CEQ Regulations which were issued in November 1978 reiterate and require that the environmental considerations be integrated "with other planning at the earliest possible time to insure that planning and decisions reflect environmental values...."

In master planning, the appropriate time to initiate the environmental effort is in conjunction with the facility requirements stage. The environmental acceptability should be considered along with the engineering feasibility in determining which alternatives should be pursued. In some cases, this effort will be fairly simple since many development items are categorically excluded from the requirement for environmental assessment. In the remaining cases, the objective of the environmental assessment should be to determine whether the alternatives will have a significant impact. Those projects having a significant impact will require further analysis. From a grant administration perspective, it may be more practical for the additional analysis of the alternatives to be accommodated through a supplemental grant.

In many cases, aircraft noise is the environmental issue that is initially focused upon in the airport planning process. The type and extent of noise analysis to be included in the project scope will be dependent upon the community's sensitivity to noise and anticipated aircraft activity. As a general guide for general aviation airports, if the adjusted number of annual operations (propeller only) is expected to be less than 90,000 or total adjusted annual business jet operations are expected to be less than 900, the noise exceeding 30 NEF (65 Ldn) will probably be contained within the airport boundaries. Adjusted annual operations are determined from "Developing Noise Exposure Contours for General Aviation Airports," FAA Report No. FAA-AS-75-1 (available through the National Technical Information Service, ADA-023429.)

In these cases, calculations of noise at individual points along the airport boundary verifying that 30 NEF (65 Ldn) contour is within the airport would be sufficient for the purposes of scoping the master plan

project. A quick method of calculating Ldn at a point is contained in the EPA's publication "Calculation of Day-Night Levels (Ldn) Resulting from Civil Aircraft Operations," EPA Report No. EPA 550/9-77-450. If the 30 NEF (65 Ldn) contour lies outside the airport boundary or a more detailed analysis is desired, the methodology contained in the previously mentioned report (FAA-AS-75-1) may be used to develop the actual contours for general aviation airports.

f. Site Selection: When site selection is proposed in a study, it is important to establish, on a preliminary basis, that a new site is necessary and supportable. If it appears that site selection is necessary, greater emphasis should be placed in the study design on determining the scope of forecasting and environmental elements as well as past site selection studies. In conjunction with this, the number of sites to be examined in detail should be specified in the project scope. When a site selection is necessary, environmental impacts of the alternative must be evaluated and weighted in the selection. In all cases, the study should provide for the sponsor to make a decision on whether a new site is a viable alternative. Continuation of a study that does not have the sponsor's full support will probably not lead to a new airport.

g. Airport Layout Plan: The objective under this element should be to prepare a plan which would be approvable by the FAA and satisfy ADAP requirements. The plan presents the preferred development alternative that has been selected after evaluating the inputs from the facility requirements, environmental analysis, and financial feasibility elements. Besides providing a plan view of the geometrical layout of the major facilities, the plan should also include profiles of the applicable FAR Part 77 surfaces. Inclusion of a property map (exhibit A) of the airport identifying the individual parcels and the interest held would be an aid to many sponsors. Similarly, a map identifying the boundaries of the individual leased area (fixed based operators, flying schools, etc.) would also be helpful. In preparing the plan, the DOT policy on design, art, and architecture should be considered. Although the details of applying this policy to an airport will be delineated in individual development projects, it may be appropriate in some cases to identify general themes and motifs in the master plan. Inclusion of such work, however, in the study would be incidental to the total master planning effort.

h. Land Use Plan: As a minimum, land uses within the existing and projected NEF 40 (75 Ldn) contours should be identified as being compatible or incompatible with the airport. This should include coordination with the local land use control authority. Development of a comprehensive land use plan to

mitigate the effects of the incompatibilities should not be undertaken unless active participation by the local land use control authority can be obtained. If this participation cannot be obtained, recommended land use changes should be general in nature since there is no real assurance of community acceptance. The land use guidance charts contained in AC 150/5050-6, Airport-Land Use Compatibility Planning, should provide a basis for such recommendations.

i. Terminal Area Plans: In most cases involving general aviation airports, and low activity air carrier airports it will not be necessary to develop separate terminal area plans. The level of detail shown in the airport layout plan will usually suffice. For high activity air carrier airports, a separate plan showing the conceptual layout of the terminal may be desirable. In these cases, the proposed passenger capacity of the terminal and the automobile capacity of the parking lots should be stated so that the development can be analyzed from an environmental viewpoint.

j. Airport Access Plans: In most cases involving general aviation airports and low activity air carrier airports, the level of detail shown on the airport layout plan should suffice. If the airport is located in a metropolitan area and has an off-airport access problem, the DOT's Intermodal Planning Group should be made aware of the problem. It may also be advisable to incorporate a provision in the appropriate planning agency's Unified Work Program to address the access problem.

k. Schedules and Cost Estimates of Proposed Development.

l. Economic Feasibility.

m. Financing: Elements k, l, and m--financial plans--are intertwined and should be examined together. This is becoming a more important area of the master plan as jurisdictions seek to maximize the benefits received from their tax dollars. In the past, it has also been one of the most neglected elements. Common problem areas which we have detected include:

1. Assumption that all eligible development will be funded through ADAP.
2. Unrealistic allocation of sponsor's financial resources to airport development.
3. Overstatement of income from airport.



A review of the financial plans section of 16 general aviation airports master plans indicated that all assume full Federal participation for all eligible work. Six of the plans overstated Federal participation by indicating eligibility of ineligible work (such as construction of hangars), incorrectly indicating the financial contribution of other Federal programs (e.g., EDA), or indicating the wrong ADAP participation rate.

Improvements must be made in this area. A more realistic picture of ADAP availability must be presented. In this respect, it would be beneficial (especially for airports not receiving entitlements or those dependent upon receiving a substantial amount of discretionary funds) to prepare two development schedules--one on the assumption that Federal aid would be received and the other on the assumption that limited or no Federal aid would be received. The priority given to the development items may vary between the two schedules.

Historically, development schedules have been presented in a format which relates the development to time; i.e., certain improvements would be needed by a certain year. The activity forecasts which the timing of improvements is based upon are not explicitly stated in the development schedules. Consequently, the presented development schedules quickly become outdated if the forecasts do not develop in the time frames that were originally envisioned. To increase their life, development schedules could be tied to activity levels; e.g., a new runway will be needed when annual operations reach 250,000.

The financial feasibility for airport improvements recommended in the master plan often receives a very shallow analysis (especially at smaller airports). Rather than being treated as an integral part of the planning process, which could affect the alternative analysis, the financial plans efforts are often looked upon as being adjunct to the rest of the planning effort. The question of whether the airport sponsor has the nonfederal share of the development funds or whether the airport will be self-sufficient or require local tax support is sidestepped by pointing to perceived benefits that will be obtained from the improved airport (e.g., attraction to industry). Although projections of expected income from the airport are stated, little consideration is given to the sensitivities of that income. Rarely is guidance provided on lease alternatives for fixed base operations, concessionaire, etc. Consequently, the airports often become locked into long leases whose terms do not provide for adjustment to take into account future economic conditions.

In the past, many master plans have recommended that the local share of airport improvements be financed through general obligation bonds. (Note: This often occurs at small airports that do not have a proven record of income which would justify the use of revenue bonds.) The master plan justifies the use of general obligation bonds (which are secured by the general taxing power of the sponsor) through the perceived benefits of the improved airport.

- . If the master plan is to realistically portray the financial feasibility of planned airport improvements, a proposal to use general obligation bonds should be closely coordinated with the authorities having the taxing power to underwrite the bonds. The coordination is needed to provide a measure of acceptability of an airport bonding proposal considering other bond demands associated with schools, streets, sanitary treatment plants, etc. In some instances, the plan's major development recommendations must be termed "ambitious" when one considers the realities of the local financial situation.